

Prenatal Exposure to Perfluoroalkyl Substances is Associated with Increased Markers of Adiposity and Total Cholesterol in Infancy

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OBJECTIVE

To investigate longitudinal associations between maternal perfluoroalkyl substances (PFAS) and repeated markers of adiposity and lipid metabolism in offspring.

BACKGROUND

PFAS are surface repellants. PFAS exposure *in utero* may affect future adiposity and metabolism – by interference with fetal programming. Effects of PFAS exposure on markers of adiposity are suggestive of being gender associated.

CONCLUSION

Higher maternal 1st trimester PFAS concentrations were associated with increased longitudinal markers of adiposity and higher total cholesterol in female offspring in infancy.



METHODS

Odense Child Cohort (OCC):

2,874 mother-child pairs. At gestational week 11, five serum PFAS concentrations were measured in 649 women. Ponderal index (kg/m^3) was assessed at birth, three months, and 18 months of age. Body fat % (BF%) and plasma total cholesterol (TC) were evaluated in offspring at ages three and 18 months.

Statistics:

Age- (month-by-month) and sex-specific standard deviation scores (SDS) for ponderal index, BF%, and plasma total cholesterol were calculated.

Mixed-effects linear regression: Associations between PFAS and ponderal index SDS.

Linear regression: Associations between PFAS and BF% SDS and plasma TC SDS.

RESULTS

Serum PFAS concentrations, Median (5th, 95th percentile):
PFHxS: 0.30 (0.08, 0.66) ng/mL
PFOS: 8.04 (3.82, 15.46) ng/mL
PFOA: 1.62 (0.67, 4.03) ng/mL
PFNA: 0.66 (0.33, 1.52) ng/mL
PFDA: 0.26 (0.15, 0.53) ng/mL

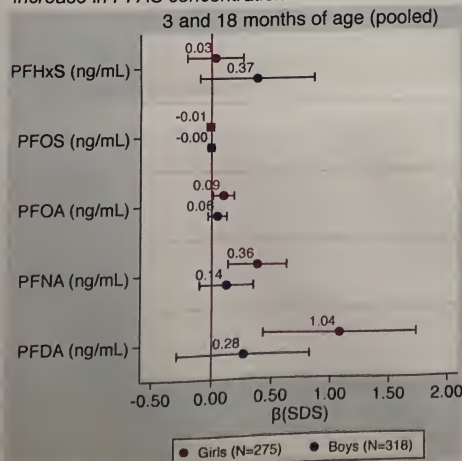
Higher PFOA, PFNA, and PFDA were associated with increased ponderal index SDS at ages three and 18 months in girls (Figure 1).

Increased PFOA, PFNA, and PFDA were associated with higher BF% SDS at three months of age in girls and boys (Figure 2).

Higher PFDA was associated with increased TC SDS at 18 months of age in girls (Figure 3).

Figure 1

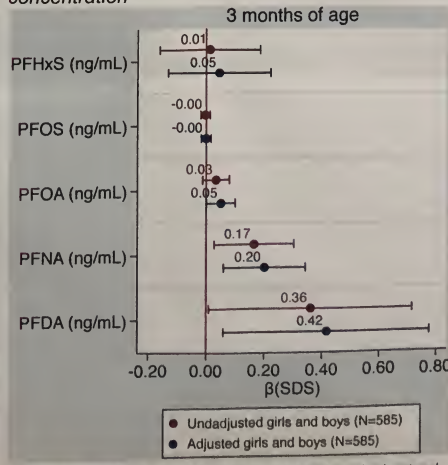
Change in ponderal index SDS by one unit increase in PFAS concentration



Adjusted for maternal age, parity, pre-pregnancy BMI, educational level, maternal smoking, visit (three months; 18 months), and ponderal index at birth

Figure 2

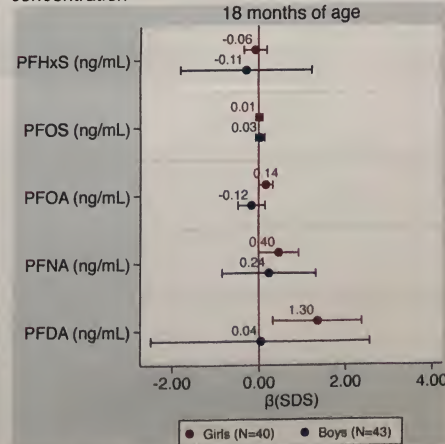
Change in BF% SDS by one unit increase in PFAS concentration



Adjusted for maternal age, parity, pre-pregnancy BMI, educational level, maternal smoking, and offspring sex

Figure 3

Change in TC SDS by one unit increase in PFAS concentration



Adjusted for maternal age, parity, pre-pregnancy BMI, educational level, maternal smoking, and TC SDS at three months of age

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